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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of	)	
	)	
Amendment of Part 90 of the	)	
Commission's Rules to Adopt	)	PR Docket No. 93-61
Regulations for Automatic	)	
Vehicle Monitoring Services	)	

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REPLY OF AMTECH CORPORATION

AMTECH Corporation ("AMTECH"), by its attorneys, hereby replies to the oppositions to and comments on its April 24, 1995, Petition for Partial Clarification and Reconsideration ("AMTECH Petition"). As explained below, the AMTECH Petition should be granted. The oppositions to AMTECH's proposed modifications of the height/power limits for non-multilateration systems were based on the misinterpretation of AMTECH's intent and are addressed through a simple clarification. Moreover, there is no policy or record basis for extending the elevation of Part 15 status relative to multilateration systems to non-multilateration systems as well. Further, AMTECH's request for an additional 2 MHz of spectrum to be shared between non-multilateration and multilateration systems is well supported by the record, including submissions by SWBMS, the only opponent of AMTECH's proposal. In addition, the Commission should adopt AMTECH's frequency tolerance proposal as the most reasonable approach, although the FCC may want to incorporate the degree of flexibility proposed by Hughes in the center of the two non-multilateration sub-bands. Finally, AMTECH submits that Hughes' proposal in its opposition for a maximum transmission duration for multilateration LMS mobiles would be inadequate to protect lane-based non-multilateration systems.

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I. AMTECH'S PROPOSAL TO MODIFY THE HEIGHT/POWER LIMITS FOR NON-MULTILATERATION SYSTEMS, BASED UPON CALCULATIONS ASSUMING LINE-OF-SIGHT, SHOULD BE ADOPTED.

A. The AMTECH Proposal Will Not Increase the Potential for Interference

In the AMTECH Petition, AMTECH urged the Commission to permit licensing of non-multilateration systems operating in excess of the 15 m height or 30 W ERP power limits. Specifically, AMTECH proposed that, in order to accommodate certain LMS applications that might otherwise be prohibited by the rules, the FCC permit *either* the height of a non-multilateration transmitter to exceed 15 m or the ERP thereof to exceed 30 W, *provided that* the power or height, respectively, is reduced to ensure that the radiated field strength does not exceed 90 dBuV/m at one mile, six feet above the ground. *AMTECH Petition* at 12-13.[1] (*See* Appendix for abbreviations of parties and pleadings used herein.) This field strength is equivalent to that produced by a facility operating at 30 W ERP from a height of 15 m above ground in a free-space, line-of-sight environment. *Id.* at 12 n.21.

A number of Part 15 interests took issue with AMTECH's proposal. The basic concern of these parties is that in a *non-line-of-sight* environment (*i.e.*, urban or suburban), ERPs well above 30 W ERP could be generated by transmitters at 15 meters yet still meet the limit AMTECH proposes. AMTECH did not intend to accommodate such a result. Notably, these commenters did not contest the essential equivalency of the field strength limit with the FCC's height/power maximums in a free space environment. (*See* note 1, *supra.*)

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[1] AMTECH did not round up to arrive at this figure as TIA suggests. *TIA at 14.* In fact, in the worst case scenario, the calculation leads to a field strength calculation 6 dB greater than TIA's result in a free-space environment due to constructive interference from ground reflection (Bullington model), or 91.4 dBuV/m. Thus, 90 dBuV/m was actually achieved by rounding down.

Accordingly, AMTECH offers the following clarification of its proposal: the applicant or licensee wishing to use more than 30 W ERP *or* employ a transmitter at a height more than 15 m above ground shall demonstrate compliance with the 90 dBuV/m field strength limit *by calculation* assuming a line-of-sight environment and using an appropriate model, taking into account any local measures designed to reduce interference in the far field (*e.g.*, shielding fencing, down-tilting of antennas).

B. The Field Strength Proposal Is Not Intended to Be a Test for Harmful Interference to Multilateration Systems.

Teletrac states that the AMTECH proposal that grandfathering of non-multilateration systems licensed under the interim rules be indefinite in the absence of harmful interference seems reasonable, *but for* AMTECH's proposed field strength limit of 90 dBuV/m. *Teletrac* at 19.[2] Teletrac's objection is based on its misinterpretation of this field strength limit as a "threshold for determining harmful interference," *id.*, apparently akin to the unrebuttable presumption of non-interference applicable to Part 15 devices.

While Teletrac's paranoia is not surprising given its concern about Part 15, AMTECH's proposal was meant merely to be an alternative standard for determining compliance with the height/power restrictions placed on non-multilateration transmitters. Just as a non-multilateration transmitter operating at or below 30 W and 15 meters may in some

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[2] Teletrac bemoans the fact that multilateration LMS systems as a group now have only 14 MHz available rather than 16 MHz under the interim rules and suggests that AMTECH's indefinite grandfathering proposal should therefore be disregarded outright. *Id.* However, given that Teletrac completely misunderstood the purpose of AMTECH's field strength limit proposal, as explained below, and that non-multilateration LMS systems experienced a similar reduction in spectrum as a result of the new rules, this objection is without merit.

circumstances cause interference to multilateration LMS systems, so, too, may such a transmitter operating below the proposed field strength limit. In either case, AMTECH understands the mutual obligations of both parties involved to work toward the resolution of the interference to apply. 47 C.F.R. §§ 90.173(b), 90.353.

C. AMTECH's Field Strength Proposal Is Not a Precursor to a Wide Array of Non-LMS Services.

Several of the Part 15 commenters state a concern that AMTECH's field strength limit proposal is a prelude to an effort to expand the permissible services that non-multilateration LMS systems may provide. *E.g., Part 15 Coalition* at 14. As AMTECH explained in its Petition, the existing height and power rules have the potential to constrain the legitimate operations of licensees under the LMS non-multilateration rules without producing any corresponding benefit in terms of interference control. *AMTECH Petition* at 9. *See discussion of examples, id.* at 10-11. Thus, AMTECH's proposal was not meant to broaden the types of permissible non-multilateration LMS services but to increase the flexibility of installed configurations by which licensees may provide LMS services that are already permitted.

Accordingly, AMTECH's field strength limit proposal should not be evaluated through the distorted filter proffered by Part 15. Rather, it should be seen for what it is, an attempt to avoid the unnecessary preparation, filing, and processing of requests for waiver of the height and power limits given that a clear method exists for conferring flexibility on non-multilateration systems without increasing the potential for interference on other users of the band.

II. THE RECORD IS CLEAR THAT THERE IS NO BASIS FOR ADOPTING PART 15 PROPOSALS TO EXTEND THE PRESUMPTION OF NONINTERFERENCE TO PART 15 DEVICES IN RELATION TO NON-MULTILATERATION SYSTEMS.

As AMTECH explained in its Opposition, adoption of the proposal by Metricom (1) to extend the Part 15 presumption of noninterference to effects on non-multilateration licensees and (2) to demonstrate that they will not cause interference to unlicensed devices, would be bad policy, bad precedent, and is not supported by the record. This position is shared by a number of other non-multilateration commenters, including the railroad industry,[3] which is equipping over 1.4 million rail vehicles with non-multilateration technology, TI,[4] and Hughes.[5]

Further, Part 15 proponents' various attempts to justify the elevation of Part 15's status relative to multilateration systems only underscore the folly of extending this unfortunate result. For example, Symbol makes an extremely formalistic, anachronistic, and simply erroneous argument that LMS is *not* a radiocommunications service. *Symbol* at 6. By its very nature, LMS systems, both multilateration and non-multilateration, involve the transmission or reception of radio signals that permit vehicles to be identified and located or

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[3] *See AAR* at 2; *see also id.* at 5-7 ("[T]he Commission made clear in the *Report and Order* [that] the rationale for applying the presumption to multilateration systems does not extend to multilateration systems.").

[4] *TI* at 2-8; "The Commission's prior expansion of protection to Part 15 already granted to the detriment of all LMS systems, should not now be taken to a gluttonous state." *Id.* at 5.

[5] *Hughes* at 2-5 (Metricom's call for applying rules governing Part 15 - multilateration systems to non-multilateration systems is not supported by the record or practical experience).

monitored, and are thus clearly communications services.[6] By comparison, the Part 15 Coalition acknowledges that LMS are radiocommunications services, but argues that the pre-existing priorities between Part 15 devices and licensed systems, in fact, have been preserved, despite the new rules. This contention promotes a type of logic reading like something proclaimed by the Ministry of Truth in *1984*:[7]

PART 15 DEVICES MAY NOT CAUSE HARMFUL INTERFERENCE
BUT HARMFUL INTERFERENCE DOES NOT EXIST

and

ACCEPTANCE OF INTERFERENCE RECEIVED IS
PROTECTION FROM UNACCEPTABLE INTERFERENCE

In essence, the Part 15 Coalition declares that, under the new rules, all Part 15 devices are still secondary, only those in the 902-928 MHz band are less secondary than others. But the plain truth is that the new rules largely make Part 15 primary to multilateration LMS. The non-multilateration industry, which serves an increasing segment of the population through a growing number of state and local governmental authorities and other entities, should not be dragged into these Orwellian dramas.

III. AMTECH'S REQUEST FOR AN ADDITIONAL 2 MHz OF SPECTRUM SHARED BY MULTILATERATION AND NON-MULTILATERATION LMS SYSTEMS IS JUSTIFIED AND SUPPORTED BY THE RECORD

In its Petition, AMTECH confirmed not only the need for 12 MHz of contiguous spectrum for advanced non-multilateration systems but also for an additional 2 MHz of

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[6] *See* 47 C.F.R. § 2.1.

[7] *Cf.* George Orwell: *1984*.

contiguous spectrum. Only SWBMS opposed this proposal, claiming that AMTECH's claim is unsupported, that no other non-multilateration proponent seeks more than 10 MHz, that sharing between multilateration and non-multilateration is not feasible, and that any suggestion that SWBMS has supported the feasibility of such sharing is "simply false." *Southwestern Bell* at 3-4.

An actual review of the record reveals that AMTECH is not the only non-multilateration licensee that has sought access to spectrum that could support at least two 6 MHz wideband multilateration channels. TI, for example, from the beginning of this proceeding sought access to a contiguous 18 MHz.[8] TI is now adamant that, at the very least, the FCC "should decline to ... *further restrict* bandwidth made available to non-multilateration systems" from that adopted in the *Report and Order*. *TI* at 19 (emphasis added). Similarly, the IAG asked the FCC to allow non-multilateration systems operated by state and local governmental authorities to have co-primary access to spectrum made available to multilateration systems, giving such authorities access to as much as 26 MHz of spectrum.[9]

Further, in the face of a record that supports only the conclusion that sharing is feasible, *see AMTECH Petition* at 19-20 & nn. 33, 35, SWBMS persists in stating that sharing is not feasible. Indeed, impeaching SWBMS's current denials are SWBMS's own clear prior statements concerning compatibility that it has never repudiated. These include

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[8] Reply Comments of TI and MFS Network Technologies, PR Docket No. 93-61 (filed July 30, 1993) at 3-5; *accord* Comments of the California Department of Transportation, PR Docket No. 93-61 (filed June 28, 1993) at (6).

[9] Comments of the Interagency Group, PR Docket No. 93-61 (filed June 29, 1993) at 11.

assertions that "SBMS' LMS system can operate reliably in the shared radio environment that *exists today* co-located *with other systems* currently operating in the same bands."[10] Moreover, SWBMS, referring explicitly to one of its receive antennas operated in close proximity to a Part 90 rail AVM installation, noted that its "test vehicle was consistently and effectively located" where the "[receive] site of concern ... participate[d] in the location of the vehicle."[11] Thus, AMTECH's position that SWBMS has provided evidence that sharing is feasible is *not* "simply false." Rather, SWBMS now simply wishes that it were false.

IV. AMTECH'S FREQUENCY TOLERANCE PROPOSAL ON RECONSIDERATION IS, ON BALANCE, THE BEST APPROACH FOR NON-MULTILATERATION SYSTEMS.

In its Opposition, AMTECH noted that its approach to a frequency tolerance limit for non-multilateration systems[12] was more appropriate than those set forth by TI or Hughes. Hughes believes that the tolerance is still too restrictive under AMTECH's proposal, and seeks a tolerance of 660 ppm, or over $\pm$600 kHz. If Hughes really believes that such a

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[10] Informal Comments of Southwestern Bell Mobile Systems, Inc., concerning North American Teletrac and Location Technologies Inc.'s Application for Freeze ("Informal SW Bell Comments"), Docket 93-61, Affidavit of Keith Rainer, at 3 (June 29, 1993) (emphases added). These "other systems" include the so-called "narrowband" systems, SWBMS' earlier term for non-multilateration systems. *See* Informal Southwestern Bell Comments at 6.

[11] Reply Comments of Southwestern Bell Mobile Systems, Inc., Exhibit B: "Initial Review Indicated No Harmful Interference Between Locate One and Part 15 Devices" (Mar. 29, 1995) at (4).

[12] AMTECH's proposal was that the frequency tolerance should be $\pm$40 kHz, except for transmitters located closer than a distance, D, from the non-multilateration sub-band edges, where D = 0.5 (authorized bandwidth) +40 kHz. Transmitters operating within a distance D from the sub-band edge would have to adhere to the 0.00025 per cent tolerance adopted in the *Report and Order*.

frequency tolerance is necessary for its systems, AMTECH has no objection, provided that the frequency tolerance of 660 ppm applies only for transmitters whose center frequencies are located more than 600 kHz + 0.5 (authorized bandwidth) from the non-multilateration sub-band edges (902, 904, 909.75, and 923.75 MHz). If non-multilateration systems are located closer than this to the sub-band edges, AMTECH's proposed tolerance rule should apply.[13]

V. HUGHES' DUTY CYCLE PROPOSAL FOR MULTILATERATION LMS MOBILES IS TOO LENIENT.

Hughes proposes that multilateration LMS mobiles be limited to transmissions of maximum duration of 100 ms and a duty factor of 10 per cent. *Hughes* at 13. As AMTECH explained earlier in this proceeding, lane-based systems that locate and monitor high speed vehicles, such as automated toll plazas, have a window of opportunity to make an affirmative identification that is of approximately 100 ms in length. A significant reason for the narrowness of this window is the confined reading zone of lane-based installations such as those used by AMTECH and others that use both transmitting tag and modulated backscatter technologies. If the Commission imposes a maximum transmission length on multilateration systems, the agency should not act to the prejudice of lane-based systems, which today effectively and efficiently serve over 2,000,000 vehicles, a number that steadily is increasing.

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[13] Thus, tighter stability will be required at the band edges, where the potential for interference to multilateration systems, although small, is arguably still greater. As AMTECH has noted in Section III and consistently during this proceeding, the potential for multilateration/non-multilateration interference has been grossly overstated by some multilateration proponents that seek exclusive spectrum.

Accordingly, as in its original comments in this rulemaking, AMTECH proposes that, if the Commission adopts maximum transmission limit on multilateration LMS mobiles, it should be 10 ms, with only one transmission per mobile within any 100 ms period.[14] This is effectively a 10 per cent duty factor as proposed by Hughes. The FCC should also make clear that, if it imposes such restrictions, multilateration and non-multilateration systems still have a mutual obligation to resolve any interference despite adherence to these transmission length and duty cycle requirements pursuant to Section 90.173(b) of the Rules.

Respectfully submitted,

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[14] AMTECH agrees with Hughes that the FCC should not adopt the duty factor proposed by UTC of one transmission to or from a given vehicle every thirty minutes for non-multilateration systems. *Hughes* at 14. As Hughes notes, there are numerous potential situations in which vehicles pass through successive reading zones in less than every one-half hour. *Id.*

APPENDIX

AAR	Opposition to Petitions for Reconsideration of the Association of American Railroads (May 24, 1995)
AMTECH Petition	Petition for Partial Clarification and Reconsideration of AMTECH Corporation (April 24, 1995)
Hughes	Opposition to Petitions for Reconsideration of Hughes Transportation Management Systems (May 24, 1995).
Metricom	Opposition of Metricom, Inc., and Southern California Edison Company to petitions for Reconsideration (May 24, 1995)
Part 15 Coalition	Opposition to Petitions for Reconsideration of the Part 15 Coalition (May 24, 1995).
SWBMS	Opposition and Comments of Southwestern Bell Mobile Systems, Inc., in Response to Petitions for Reconsideration (May 24, 1995)
Symbol	Comments of Symbol Technologies, Inc., on Petitions for Reconsideration (May 24, 1995).
Teletrac	Consolidated Opposition to Petitions for Reconsideration and Clarification of Airtouch Teletrac (May 24, 1995)
TI	Opposition to petitions for Reconsideration of Texas Instruments, Incorporated (May 24, 1995)
TIA	Comments of the Telecommunications Industry Association, User Premises Equipment Division, Wireless Consumer Communications Section (May 24, 1995)

CERTIFICATE OF SERVICE

I hereby certify that on this 7th day of June, 1995, I caused copies of the foregoing "Reply of AMTECH Corporation" to be mailed via first-class postage prepaid mail to the following:

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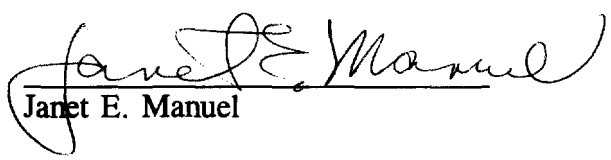

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